The Power of One or autonomous machine vision

Advances in silicon, sensors and processors are enabling canmakers to achieve a better return for automation, improved reliability, and reduced spoilage

Editorial board member Amir Novini is president and chief executive of Applied Vision Corporation based at Ohio, USA

Intel co-founder Gordon E. Moore in 1965 stated that the number of transistors on a computer chip would double approximately every two years. This trend has continued for half a century, and though this rate of progress has slowed somewhat in recent years, it is undeniable that processing speed, memory capacity, sensors and the capabilities of many digital electronic devices today remain linked strongly to Moore's law.

The canmaker will ask, "Can the pace of silicon technology keep pace with my demands for better performance and lower costs?" To which I reply, absolutely! Once shared and centralised, machine vision in food and beverage container inspection is evolving as autonomous and distributed as exceedingly powerful processors, smarter cameras, solid-state hard drives and LED illumination shepherd greater advances in software sophistication, from self-learning algorithms to pattern locating tools to highly accurate colorimetric measurements.

What I more simply call 'The Power of One' – a single data source coupled to a single processor – is bringing new efficiencies to canmakers throughout the entire manufacturing process.

Today, sensors and processors are more affordable and powerful than ever, and the paths of computer technology and machine vision are no longer a crossroads, but a bridge to building an autonomous, advantageous future for canmakers who invest in a distributed vision strategy.

And it is not just for canmakers – scenarios abound where a distributed computer programme is preferred to solve problems, from related industrial control systems to telecommunication networks. Where data is produced in one physical location and is needed in another, or where a group of low-end computers can operate as effectively but more cost-efficiently than a single high-end machine, here a distributed system – that may also be easier to expand, and is inherently without a single point of failure – must be considered.

Continuation down the path of centralised computing and shared processing yields progressively diminishing returns, though applications will certainly remain in some instances where a multiple-camera/single-processor solution endures as the appropriate answer – internal can inspection, as an example, where cameras work in close proximity on the same line.

Yet as inspections become more complex, and images more resolute, the risk for data collision and data loss across narrowing bandwidths will steadily increase. And not just an image – any data gathering device, be it pressure, vibration or temperature, will share increasingly crowded data highways with myriad other bits of information, until too much is squeezed too tightly, and system lock-up occurs.

There is a better return-on-investment for autonomous, dedicated processing – a camera and CPU integrated into one unit, focused exclusively on one task as opposed to other multiple inspections. When the process is focused and 'comfortable' the reliability of the inspection is enhanced and hence the risk of spoilage reduced. And as a parallel processing operation, should one unit fail, it will have no impact on any other inspections, opposed to a standard serial processing configuration.

Advances in silicon, sensors and processors have led us to a single sensor/single processor solution that promises better return for investment for automation in canmaking plants worldwide for years to come.